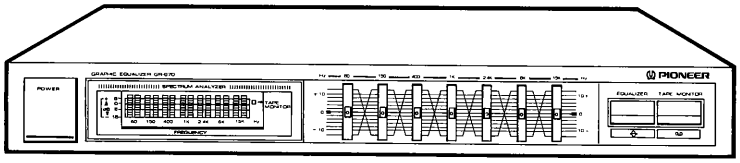
Operating Instructions

GRAPHIC EQUALIZER
GR-870



Thank you for buying this Pioneer product.
Please read through these operating instructions and then you will know how to operate your model properly. After you have finished reading the instructions, put them away in a safe place for future reference.
In accordance with the power and voltage requirements of differing areas, the following model names are used to designate models with differing electrical specifications.

Models	Line voltage
HE, HEM, NEM, HEZ, NE, NEZ	a.c. 220 volts ~
WE, WB, WP	a.c. 220–240 volts ~
S, S/G, SS	~AC 110/120/220/240 volts (Switchable voltage)
R, R/G	~AC 110–120/220–240 volts (Switchable voltage)
HB, HP, YB, YP	a.c. 240 volts ~
KU, KC	AC 120 volts

NOTES:
- *The model names are stamped on the packing case.*
- *These operating instructions are prepared on the basis of the HEM model, and they can be used for other models. Although the design of the power plug and the power outlet shown may differ from the actual one, the operating procedures are the same.*

[For canadian model]

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

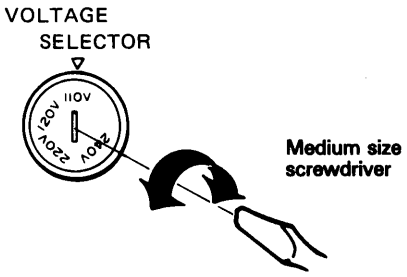
ATTENTION: POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

LINE VOLTAGE SELECTOR SWITCH

Only multi voltage models are provided with this switch, U.S.A., Canadian, U.K., Australia and Europe models are not provided with this switch.

You will find the line voltage selector switch on the rear panel. Before your model is shipped from the factory, the switch is set to the power requirements of the destination; nevertheless, you should check that it is set properly before plugging the power cord into the AC outlet. If the voltage is not properly set, or if you move to an area where the voltage requirements differ, adjust the selector switch as follows. Before adjusting, disconnect the power cord.

1. Provide yourself with a medium size screwdriver.
2. Insert the screwdriver into the groove of the selector switch and turn it so that the power voltage marking of your area points to the arrow.



WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

IMPORTANT NOTICE

[For U.S.A. and Canadian models]

The serial number for this equipment is located on the rear panel. Please write this serial number on your enclosed warranty card and keep in a secure area. This is for your security.

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PIONEER®

SAFETY INSTRUCTIONS

READ INSTRUCTIONS — All the safety and operating instructions should be read before the appliance is operated.

RETAIN INSTRUCTIONS — The operating instructions should be retained for future reference.

HEED WARNING — All warnings on the appliance and in the operating instructions should be adhered to.

FOLLOW INSTRUCTIONS — All operating and use instructions should be followed.

WATER AND MOISTURE — The appliance should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.

LOCATION — The appliance should be installed in a stable location.

WALL OR CEILING MOUNTING — The appliance should not be mounted to a wall or ceiling.

VENTILATION — The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

HEAT — The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.

POWER SOURCES — The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

POWER-CORD PROTECTION — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

POLARIZATION — If your purchased product is provided with a polarized power plug, please read the following instructions. This product is equipped with a polarized alternating current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

CLEANING — The appliance should be cleaned only with a polishing cloth or a soft dry cloth. Never clean with furniture wax, benzine, insecticides or other volatile liquids since they may corrode the cabinet.

POWER LINES — An outdoor antenna should be located away from power lines.

NONUSE PERIODS — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.

OBJECT AND LIQUID ENTRY — Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

DAMAGE REQUIRING SERVICE — The appliance should be serviced by Pioneer authorized service center or qualified service personnel when:

- The power-supply cord or the plug has been damaged; or
- Objects have fallen, or liquid has been spilled into the appliance; or
- The appliance has been exposed to rain; or
- The appliance does not appear to operate normally or exhibits a marked change in performance; or
- The appliance has been dropped; or the enclosure damaged.

SERVICING — The user should not attempt to service the appliance beyond that described in the operating instructions. For all other servicing, contact the nearest Pioneer authorized service center.

OUTDOOR ANTENNA GROUNDING — If an outside antenna is connected to the antenna terminal, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges.
In the U.S.A. section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Fig. A.

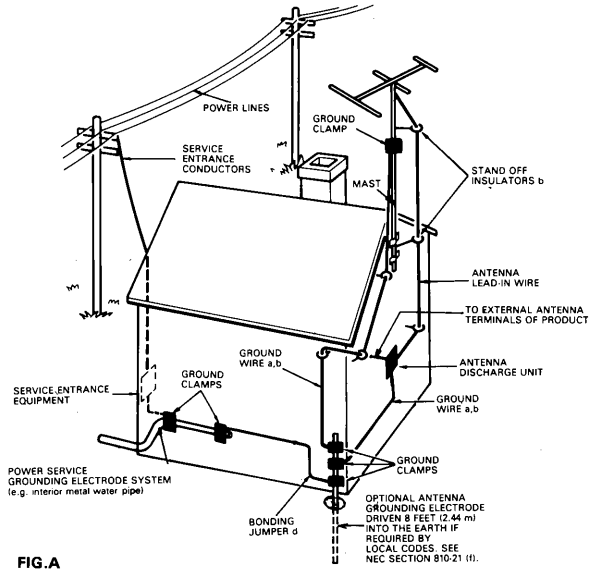

POWER LINES
GROUND CLAMP
SERVICE ENTRANCE CONDUCTORS
MAST
STAND OFF INSULATORS b
ANTENNA LEAD-IN WIRE
TO EXTERNAL ANTENNA TERMINALS OF PRODUCT
GROUND WIRE a,b
ANTENNA DISCHARGE UNIT
GROUND CLAMPS
SERVICE ENTRANCE EQUIPMENT
GROUND WIRE a,b
GROUND CLAMPS
POWER SERVICE GROUNDING ELECTRODE SYSTEM (e.g. interior metal water pipe)
BONDING JUMPER d
OPTIONAL ANTENNA GROUNDING ELECTRODE DRIVEN 8 FEET (2.44 m) INTO THE EARTH IF REQUIRED BY LOCAL CODES. SEE NEC SECTION 810-21 (f).

FIG.A

a) Use No. 10 AWG (5.3 mm²) copper, No. 8 AWG (8.4 mm²) aluminum, No. 17 AWG (1.0 mm²) copper-clad steel, bronze wire, or larger as ground wire.
b) Secure antenna lead-in and ground wires to house with stand-off insulators spaced from 4 feet (1.22 meters) to 6 feet (1.83 meters) apart.
c) Mount antenna discharge unit as closely as possible to where lead-in enters house.
d) Use jumper wire not smaller than No.6 AWG (13.3 mm²) copper or equivalent when separate antenna-grounding electrode is used.

IMPORTANT 1

The lightning flash with arrowhead, within an equilateral triangle, is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION:
TO PREVENT THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

IMPORTANT 2

If the apparatus is fitted with AC mains power outlet(s), see REAR PANEL FACILITIES for convenient connection of additional Hi-Fi component(s). Make all connections to the AC outlet(s) and the signal terminals first. Connect the plug to the wall socket last, make sure that the power switch is off. Disconnect the wall plug when the equipment is not in (regular) use, e.g. when on vacation.

FOR USE IN THE UNITED KINGDOM

WARNING: This plug must only be connected to electronic apparatus equipped with suitable sockets.
Otherwise cut off and dispose of the plug, and fit an appropriate one in accordance with the instructions below.

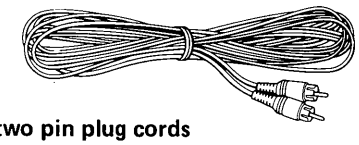
The wires in this mains lead are coloured in accordance with the following code:

Blue: Neutral
Brown: Live

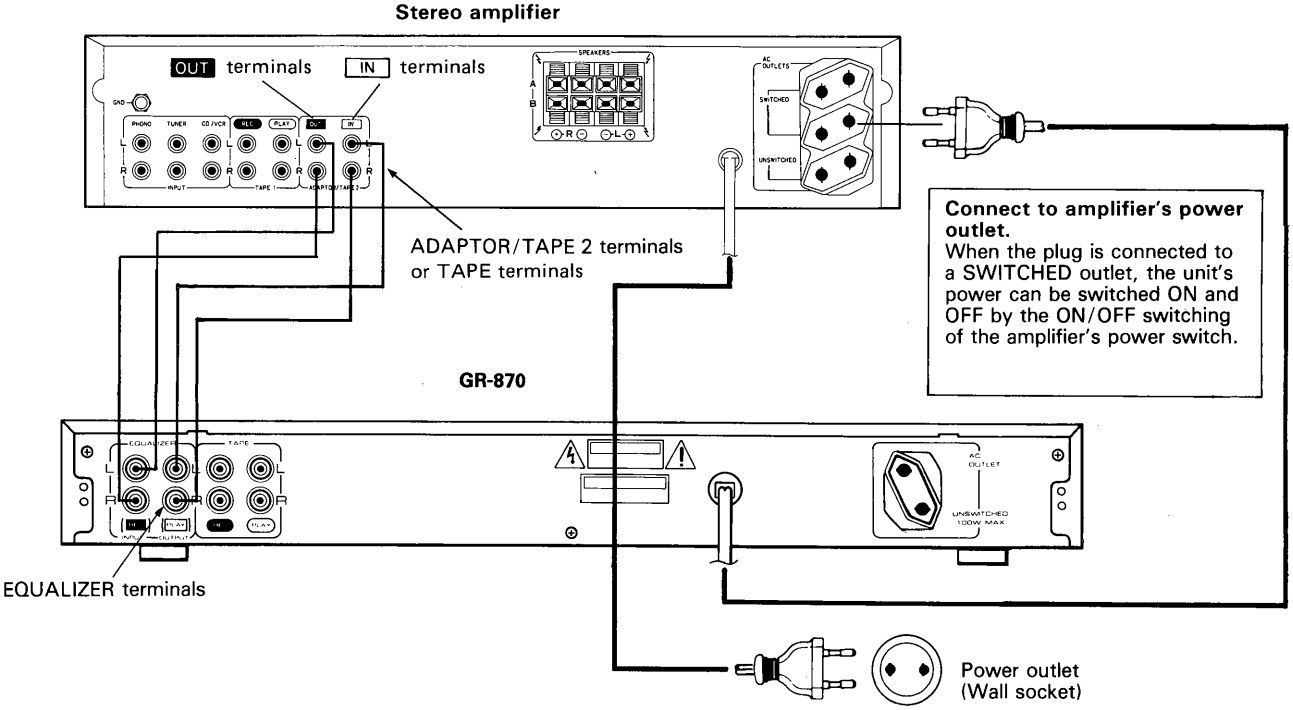
As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured marking identifying the terminals in your plug proceed as follows:
The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.
The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

CONNECTIONS

The figure shows an example of the connections when the unit is used in combination with the Pioneer's stereo amplifier.
For details, refer to the Operating Instructions of your stereo amplifier.

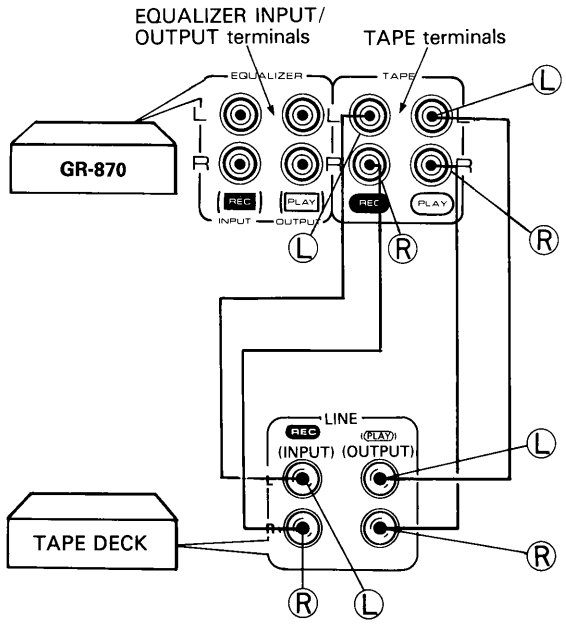


The accessory two pin plug cords
These are used to connect the unit with the stereo amplifier.
The white plug is for the left channel (L) and the red plug is for the right channel (R).


Stereo amplifier
OUT terminals
IN terminals
ADAPTOR/TAPE 2 terminals
or TAPE terminals
GR-870
EQUALIZER terminals
Connect to amplifier's power outlet.
When the plug is connected to a SWITCHED outlet, the unit's power can be switched ON and OFF by the ON/OFF switching of the amplifier's power switch.
Power outlet
(Wall socket)

TAPE TERMINAL APPLICATIONS

- Use the TAPE terminals when connecting a tape deck or when connecting an adaptor such as a mic mixing amplifier.

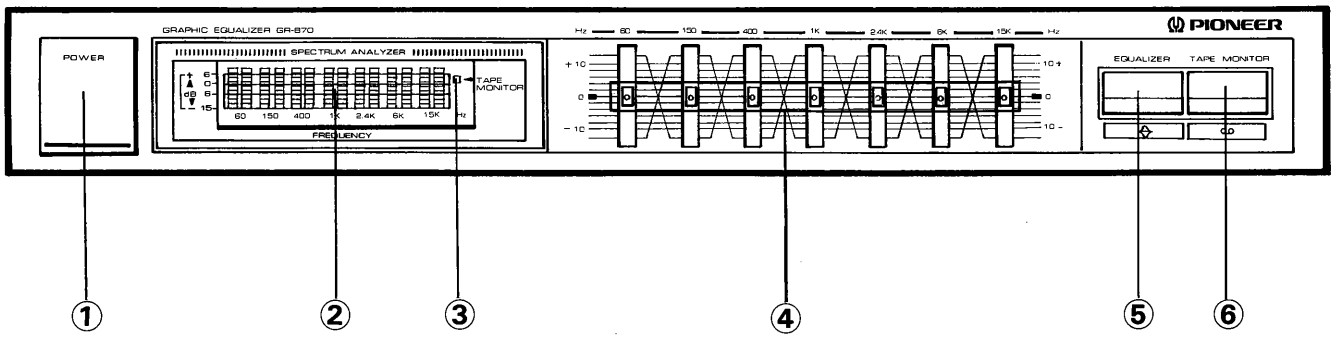


AC OUTLET (UNSWITCHED 100W MAX)

Power flows continually to this outlet, regardless of whether the equalizer is switched ON or OFF. Electrical power consumption of the connected equipment should not exceed 100 W. The equipment should be disconnected by removing the mains plug from the wall socket when not in regular use, e.g. when on vacation.

NOTE:
Do not connect appliances with high power consumption such as heaters, irons, or television sets to the AC OUTLET in order to avoid overheating or fire risk.
This can cause the equalizer to malfunction.

FRONT PANEL FACILITIES



① POWER switch

When this switch is set to the ON position, power is supplied to the unit's main circuits.
Disconnect the power cord from the power outlet when you do not plan to use the unit for a long period of time.

② SPECTRUM ANALYZER indicator

Shows the variation of signal level over each frequency band by means of an F.L. tube.
This can be used to check frequencies during ordinary playback of the program source.

③ TAPE MONITOR indicator

When the tape monitor switch is turned on, this indicator lights up.

④ Octave controls/Equalizer indicator

Move these controls above or below the center (zero) position to boost or attenuate the corresponding frequency band. The seven frequency bands are centered at 60 Hz,150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, and 15 kHz.
The equalizer indicators of each control serve as a guideline for the changes in the frequency response.
Note that the Equalizer indicators go on or off when the EQUALIZER switch is pushed. They light when the EQUALIZER switch is ON, and go off when it is OFF.

⑤ EQUALIZER switch

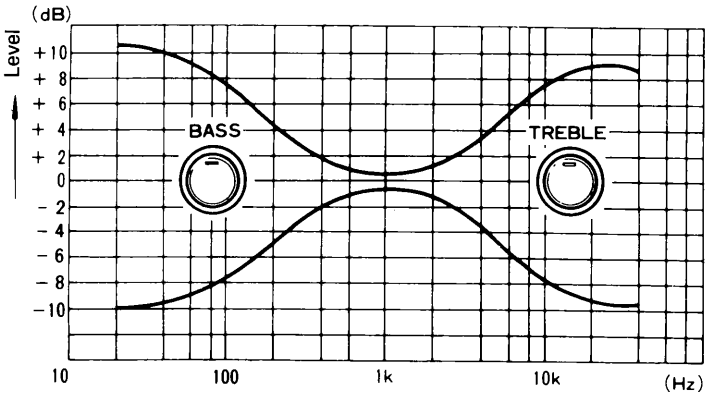
When this switch is pushed , the Equalizer indicators in the OCTAVE controls will light, signaling that the EQUALIZER is on and that you can compensate for the frequency response of the signals entering the EQUALIZER INPUT and TAPE PLAY terminals. The compensated signals are then output from both the EQUALIZER OUTPUT terminals and TAPE REC terminals.

⑥ TAPE MONITOR switch

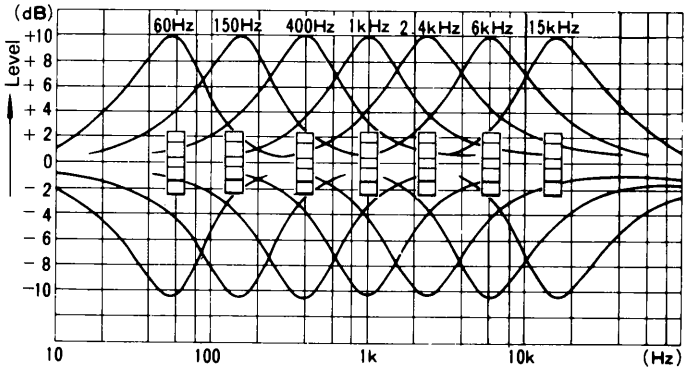
Push this switch to play the tape deck connected to the rear panel of this unit; the tape monitor indicator located within the spectrum indicator turns on. Switch the indicator off when the tape deck is not in use.

OPERATING THE GRAPHIC EQUALIZER

The graphic equalizer divides the music source into a number of frequency bands and boosts or attenuates the level at each of the frequencies, enabling much finer sound quality adjustments than ordinary tone controls and sound field compensation.
Some examples of operation are given below.



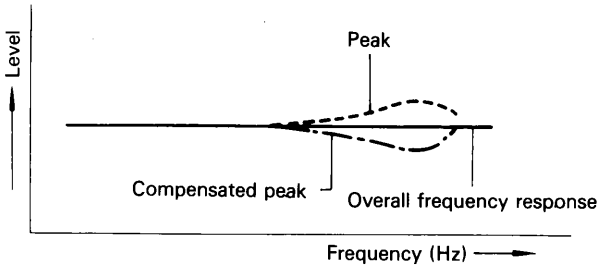
Amplitude of change in frequency response using ordinary tone controls



Amplitude of change in frequency response using graphic equalizer controls

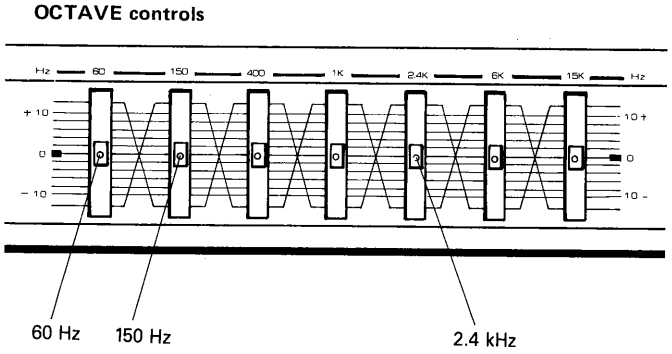
COMPENSATING FOR THE PLAYBACK FREQUENCY RESPONSE

The frequency response of a phono-cartridge or speaker has peaks and dips in the high range and low range. It can be made flat by adjusting finely the controls on the graphic equalizer.

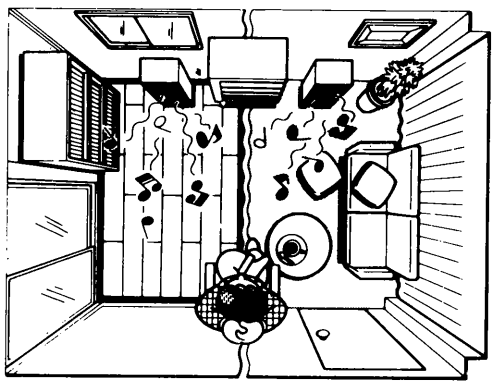


IMPROVING THE ACOUSTICS OF THE LISTENING ROOM

The ideal listening room is one where the transmission frequency response is flat. In actual fact, however, the acoustics vary depending on the effects of the structure of the room and its furniture and on the listening position.



Although there is minimal treble attenuation in a listening room surrounded by hard walls and windows and having a bare floor, the bass sounds are reflected to a great extent. In rooms, like this, turn up the 150 Hz control slightly.
In a room surrounded by drapes and with carpets on the floor, there is minimal reflection of the sound and both the bass and the treble are absorbed.

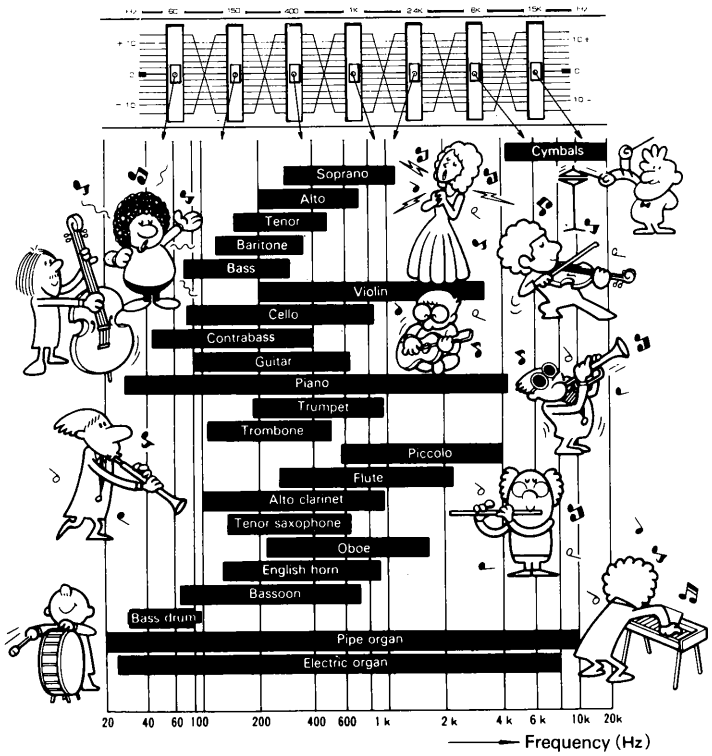


In rooms like this, turn up the 60 Hz control slightly and turn up the frequency controls above 2.4 kHz gradually.
The above examples are extremely general.
The acoustics undergo change in accordance with the furniture in the listening room, the height of the ceiling and the listening position, among other factors. Play the music and try operating each of the controls to produce the best effect.

COLORING THE REPRODUCED SOUND

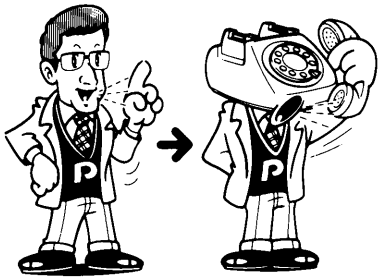
All instruments and vocals have their own frequency band, as shown in the figure.
By moving the controls up or down, the volume of the instruments preferred can be boosted or other instruments can be attenuated.
For instance, it is possible to boost the 60 Hz frequency and give the bass drum and greater "punch" or boost the 1 kHz frequency and position the vocals at the front. When the 6 kHz frequency is boosted, the cymbals and "high hat" sound much clearer.
Instruments and vocals have a great many harmonic components along with the fundamental frequency band and so you can have lots of fun operating the 7 controls to achieve the sound of your choice.

NOTE:
In order to protect the speakers from damage resulting from power overload, do not excessively increase the stereo amplifier's volume level when boosting the treble range on this unit.



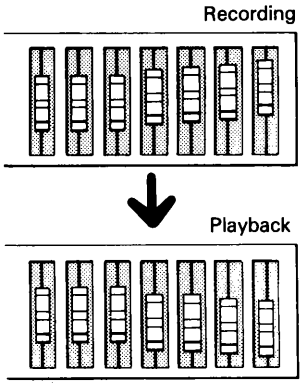
RECORDING TECHNIQUES USING GRAPHIC EQUALIZER

Coloring the sound of vocals or instruments
The sound of vocals and instruments can be colored at will by operating the controls. For instance, when the 400, 1 k and 2.4 k controls are raised and the other controls lowered, people's voices sound as if heard on a telephone.

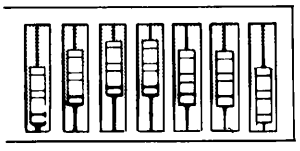


Preventing howl during mixing play
Any irritating howl during play can be prevented by lowering the knob corresponding to the frequency band in which the howl occurs.

Noise can be reduced during recording and playback
When the high-range controls are boosted in step fashion during recording and then lowered in reverse fashion during playback, tape hiss and other high-range noise can be reduced.



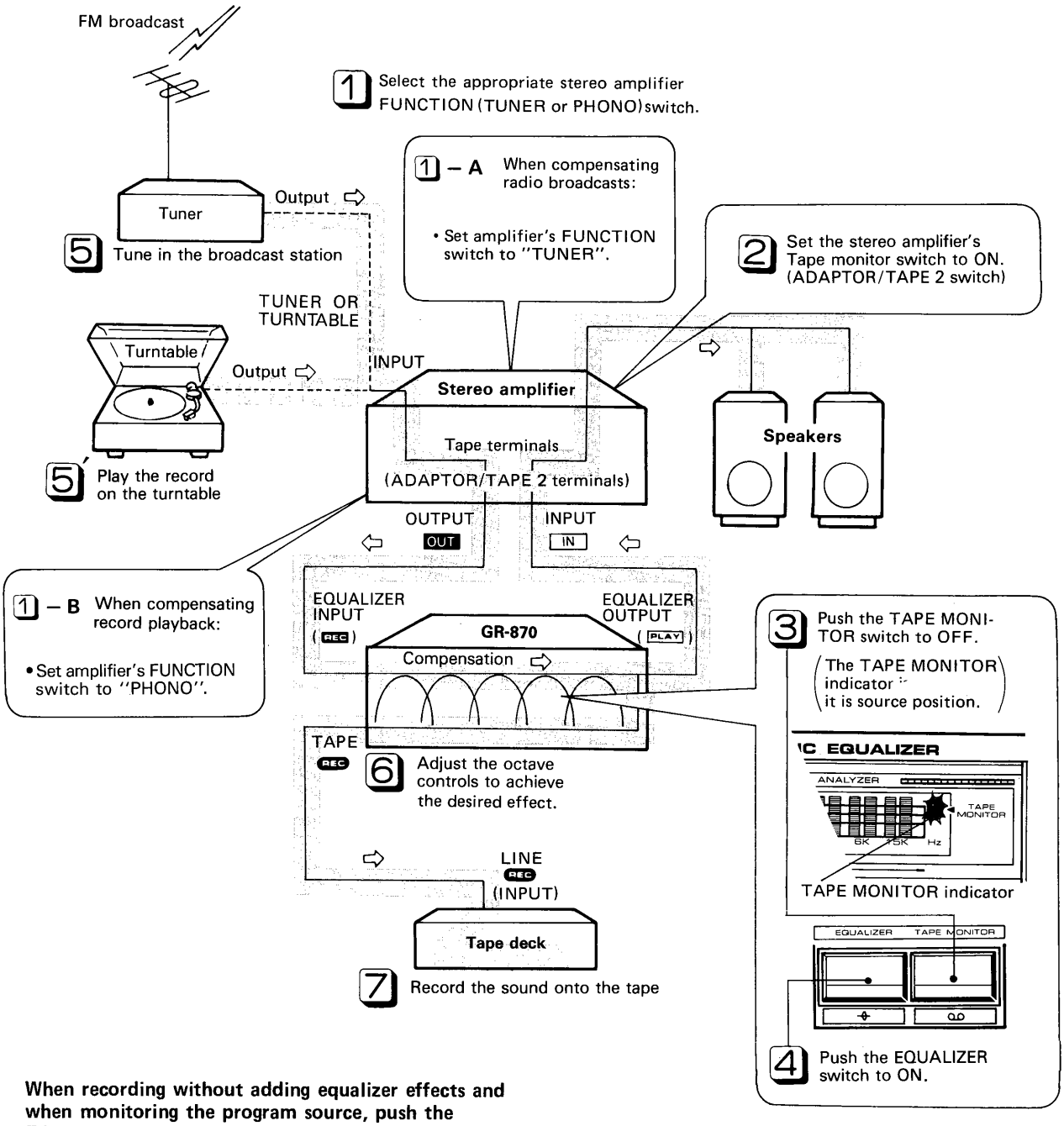
Creating recorded tapes most compatible with the playback equipment
A sound with a greater "punch" can be recorded for playback on car stereo equipment if the ultra-low-range, which is hard to hear, is cut out and the mid-range is boosted.



COMBINED OPERATION

■ Tape recording a record program or radio broadcast with equalizer compensation added.

Operate in the numerical sequence

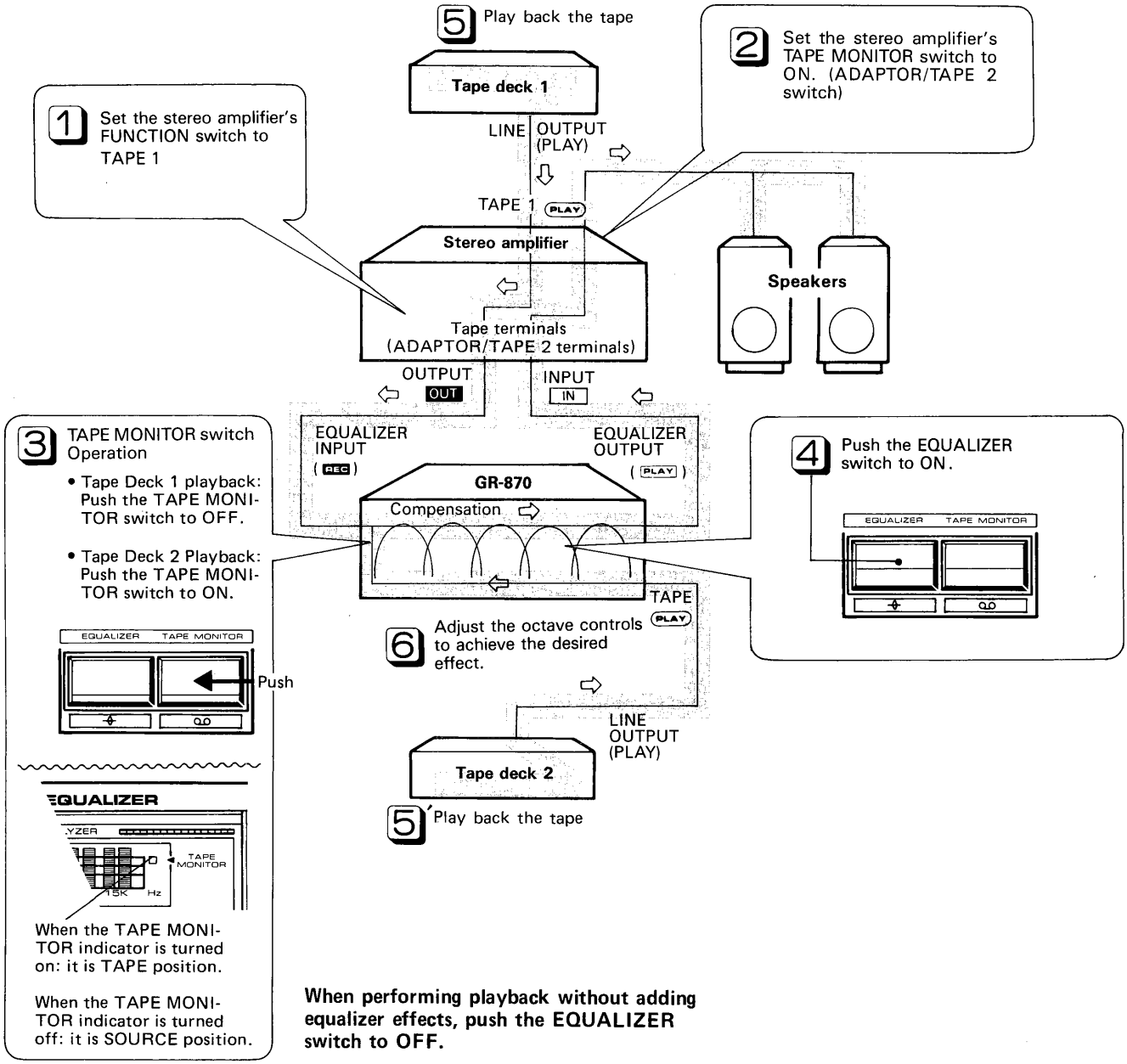


When recording without adding equalizer effects and when monitoring the program source, push the EQUALIZER switch to OFF.

Recordings made from radio broadcasts, records or other material may be used for personal enjoyment but may not be used in a way which will infringe the rights of copyright owners and be contrary to law.

■ Compensating tape playback with equalizer effects

——— Operate in the numerical sequence.———

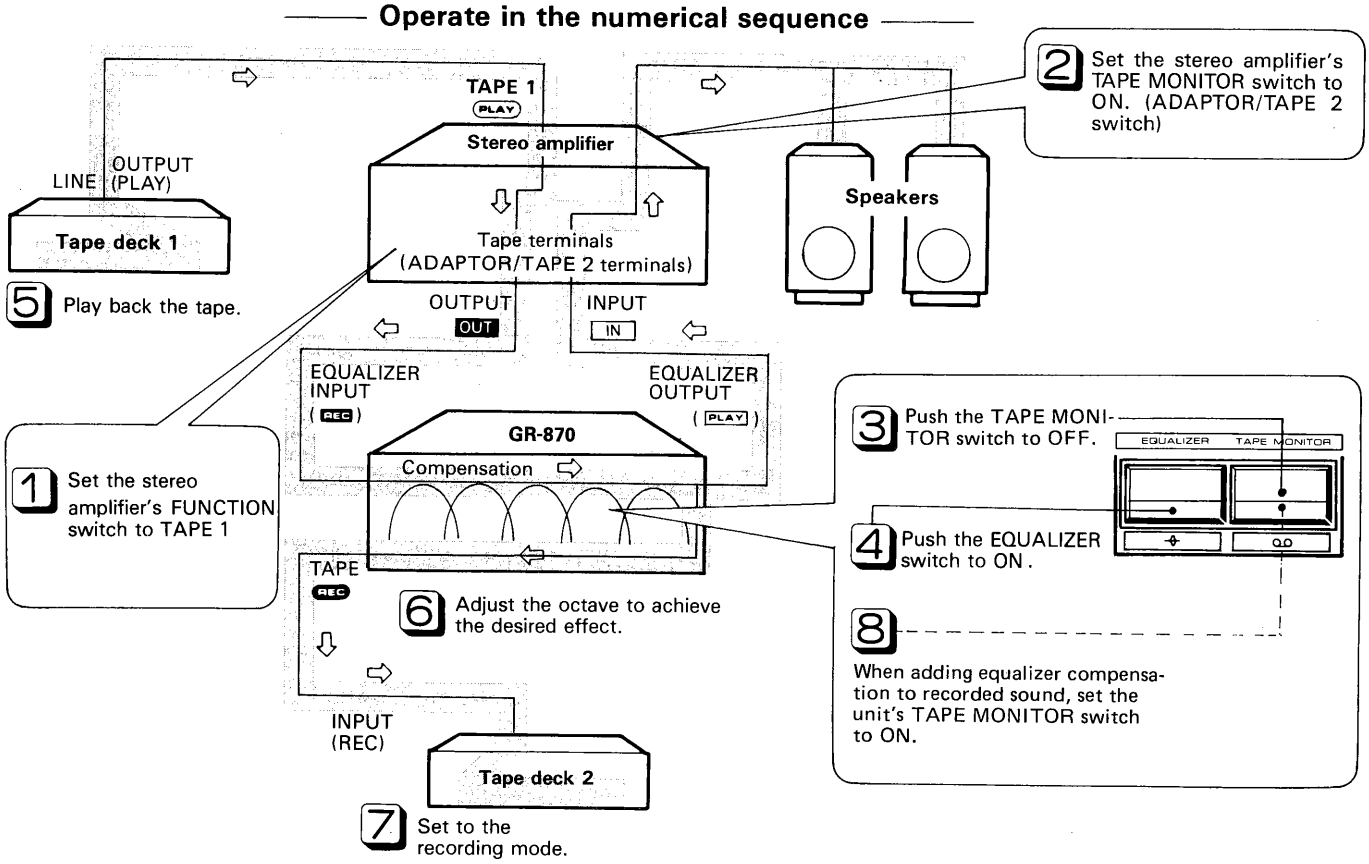

5 Play back the tape
Tape deck 1
LINE OUTPUT (PLAY)
TAPE 1 PLAY
1 Set the stereo amplifier's FUNCTION switch to TAPE 1
2 Set the stereo amplifier's TAPE MONITOR switch to ON. (ADAPTOR/TAPE 2 switch)
Stereo amplifier
Speakers
Tape terminals (ADAPTOR/TAPE 2 terminals)
OUTPUT OUT
INPUT IN
3 TAPE MONITOR switch Operation
• Tape Deck 1 playback: Push the TAPE MONITOR switch to OFF.
• Tape Deck 2 Playback: Push the TAPE MONITOR switch to ON.
EQUALIZER INPUT (REC)
EQUALIZER OUTPUT (PLAY)
GR-870
Compensation
TAPE PLAY
4 Push the EQUALIZER switch to ON.
EQUALIZER TAPE MONITOR
6 Adjust the octave controls to achieve the desired effect.
Push
LINE OUTPUT (PLAY)
Tape deck 2
5 Play back the tape
When the TAPE MONITOR indicator is turned on: it is TAPE position.
When the TAPE MONITOR indicator is turned off: it is SOURCE position.

When performing playback without adding equalizer effects, push the EQUALIZER switch to OFF.

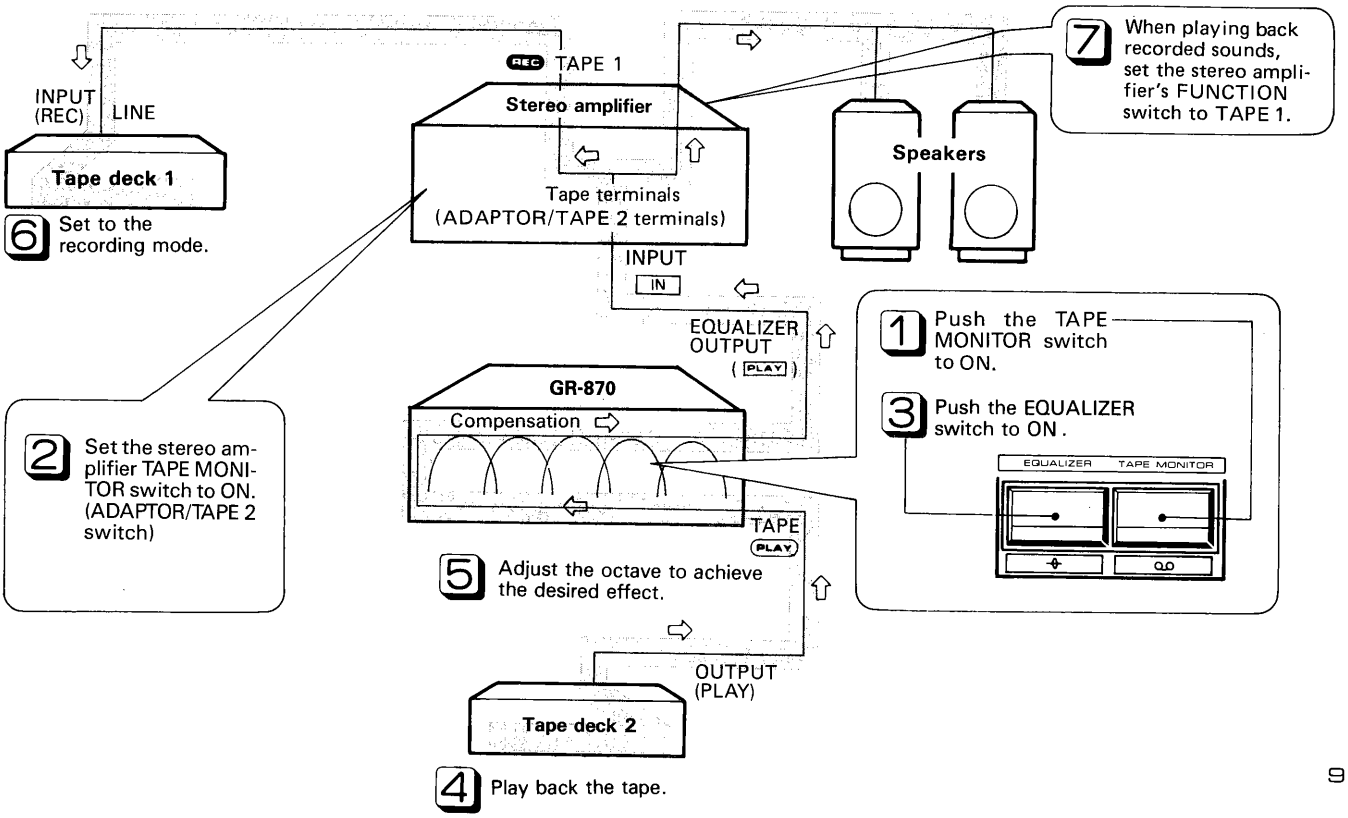
■ Performing tape editing with equalizer

When copying from tape deck 1 to tape deck 2 while equalizing.

Operate in the numerical sequence

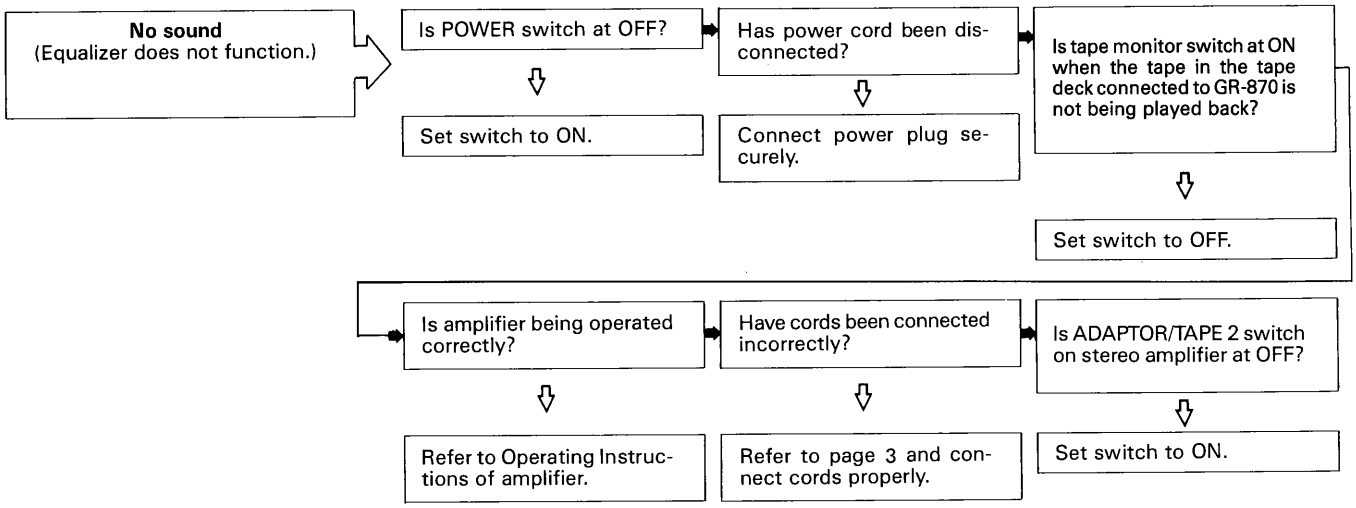

TAPE 1
PLAY
Stereo amplifier
LINE OUTPUT (PLAY)
Tape deck 1
Tape terminals (ADAPTOR/TAPE 2 terminals)
Speakers
OUTPUT OUT
INPUT IN
EQUALIZER INPUT (REC)
EQUALIZER OUTPUT (PLAY)
GR-870
Compensation
TAPE REC
INPUT (REC)
Tape deck 2
2 Set the stereo amplifier's TAPE MONITOR switch to ON. (ADAPTOR/TAPE 2 switch)
5 Play back the tape.
1 Set the stereo amplifier's FUNCTION switch to TAPE 1
3 Push the TAPE MONITOR switch to OFF.
EQUALIZER TAPE MONITOR
4 Push the EQUALIZER switch to ON.
6 Adjust the octave to achieve the desired effect.
8
When adding equalizer compensation to recorded sound, set the unit's TAPE MONITOR switch to ON.
7 Set to the recording mode.

When copying from tape deck 2 to tape deck 1 while equalizing.

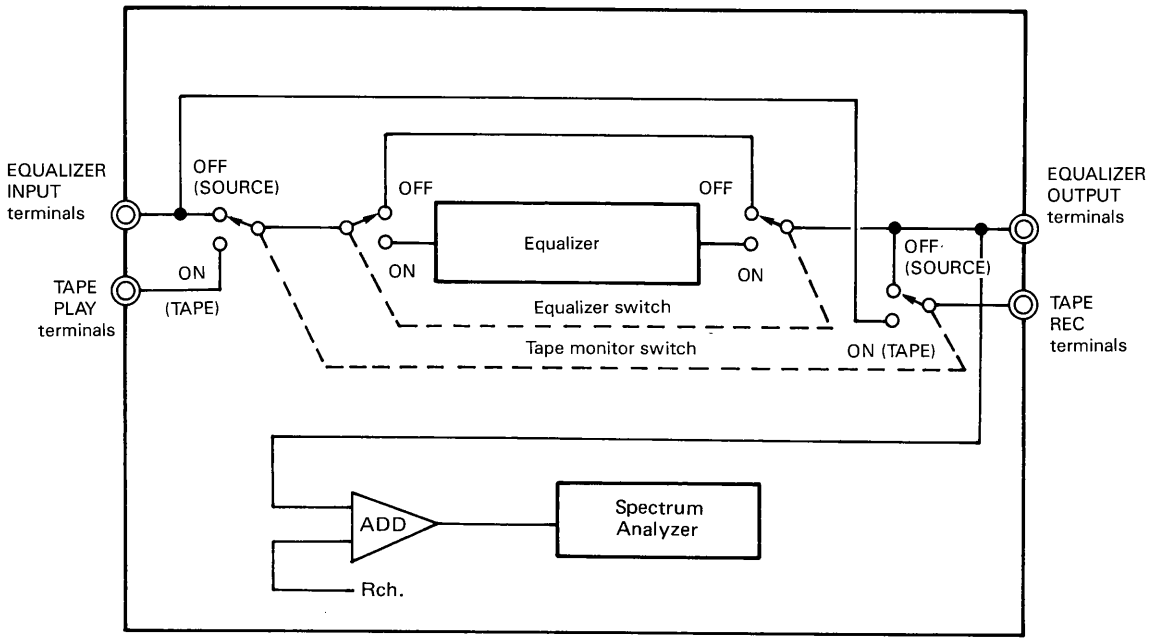

REC TAPE 1
Stereo amplifier
INPUT (REC) LINE
Tape deck 1
Tape terminals (ADAPTOR/TAPE 2 terminals)
Speakers
INPUT IN
EQUALIZER OUTPUT (PLAY)
GR-870
Compensation
TAPE PLAY
OUTPUT (PLAY)
Tape deck 2
7 When playing back recorded sounds, set the stereo amplifier's FUNCTION switch to TAPE 1.
6 Set to the recording mode.
1 Push the TAPE MONITOR switch to ON.
3 Push the EQUALIZER switch to ON.
EQUALIZER TAPE MONITOR
2 Set the stereo amplifier TAPE MONITOR switch to ON. (ADAPTOR/TAPE 2 switch)
5 Adjust the octave to achieve the desired effect.
4 Play back the tape.

TROUBLESHOOTING

Incorrect operations are often mistaken for trouble and malfunctions. If you think that there is something wrong with this component, check out the points below. Sometimes, the trouble may lie in another component. Investigate the other components and electrical appliances being used.
If the trouble cannot be rectified even after exercising the checks listed below, ask your nearest PIONEER authorized service center or your dealer to carry out repair work.


No sound
(Equalizer does not function.)
Is POWER switch at OFF?
Set switch to ON.
Has power cord been disconnected?
Connect power plug securely.
Is tape monitor switch at ON when the tape in the tape deck connected to GR-870 is not being played back?
Set switch to OFF.
Is amplifier being operated correctly?
Refer to Operating Instructions of amplifier.
Have cords been connected incorrectly?
Refer to page 3 and connect cords properly.
Is ADAPTOR/TAPE 2 switch on stereo amplifier at OFF?
Set switch to ON.

BLOCK DIAGRAM



SPECIFICATIONS

Graphic Equalizer Section

Equalizer Range
- Individual channel control ..... ±10 dB
- Center frequencies .....
- 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, 15 kHz

Total Harmonic Distortion
- 20 Hz to 20 kHz (All controls at flat position, 1 V) 0.005%

Gain (all controls at flat position)..... 0 dB

Maximum Output Voltage
- 1 kHz, 0.01% THD, 50 kΩ RL..... 6 V

Frequency Response..... 5 Hz to 100 kHz $^{0}_{-3}$ dB

Signal-to-Noise Ratio
(IHF A network, short-circuited, 1 V output)..... 108 dB

Input terminal (Sensitivity/Impedance)
- INPUT ..... 150 mV/50 kΩ
- TAPE PLAY..... 150 mV/50 kΩ

Output terminal (Level/Impedance)
- OUTPUT ..... 150 mV/1 kΩ
- TAPE REC ..... 150 mV

Spectrum Analizer Section

Center frequencies .....
60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, 15 kHz

Resolution ..... 3 dB step, 8 point

Power Supply Section/Miscellaneous

Power Requirements
- KU, KC models ..... AC 120 Volts, 60 Hz
- S, S/G models .....
- ~ AC 110V/120V/220V/240V switchable, 50/60Hz
- HB and YP models ..... a.c. 240 Volts ~ 50/60Hz
- HEZ models ..... a.c. 220 Volts ~ 50/60Hz

Power Consumption ..... 10 Watts

Dimensions ..... 420(W) x 60(H) x 217(D) mm
16-9/16(W) x 2-3/8(H) x 8-9/16(D) in

Weight..... 2.6 kg (5 lb 12 oz)

Furnished Parts

Connection cords with pin plugs..... 2

Operating Instructions..... 1

Note:
Specifications and design subject to possible modification without notice due to improvements.

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